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UNITED STATES DEPARTMENT OF AGRICULTURE.

Department Circular 117.

Bureau of Plant Industry
(New and Rare Seed Distribution),
WM. A. TAYLOR, Chief.

PERUVIAN ALFALFA.

OBJECT OF THE DISTRIBUTION.—The distribution of new and rare seeds has for its object the dissemination of new and rare crops, improved strains of staple crops, and high-grade seed of crops new to sections where the data of the department indicate such crops to be of considerable promise. Each package contains a sufficient quantity for a preliminary trial, and where it is at all practicable the recipient is urged to use the seed for the production of stocks for future plantings. It is believed that if this practice is followed consistently it will result in a material improvement in the crops of the country. Please make a full report on the inclosed blank regarding the results you obtain with the seed.

DESCRIPTION.

Peruvian alfalfa was first introduced into the United States from Peru in 1899. It is in general like ordinary alfalfa, but sufficiently different to be readily distinguished from that variety. When grown as individual plants the crowns are more erect and have fewer stems than ordinary alfalfa, but when grown in a thick stand there is no appreciable difference in this respect. The leaves and stems are quite hairy, giving the plants a slightly grayish cast. The leaves are larger than those of ordinary alfalfa, being longer and as wide or wider than the leaves of that variety. When allowed to mature beyond the flowering stage the stems are coarser and somewhat more woody than the stems of the common variety, and for this reason it is desirable to cut the crop not later than when one-half in bloom. When cut at this stage of development a hay of first-class quality is produced.

In experimental tests covering a number of years Peruvian alfalfa has yielded decidedly more hay to the acre than ordinary alfalfa, the increased yield per season being about three-fourths of a ton per acre. The heavy hay-yielding quality of this variety is the chief reason for recommending it: however, the fact that it is much more certain of producing a good seed crop is also in its favor.

Peruvian alfalfa is nonhardy to severe cold and can be grown successfully only in places having mild climatic conditions. It makes

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rapid growth and quick recovery after cutting. It also has the ability to make growth in cooler weather than ordinary alfalfa. It commences earlier in the spring and continues to grow later in the fall than the common variety. On account of its nonhardiness, the area adapted to Peruvian alfalfa is limited to the western, southwestern, and southern United States. In general, it may be said that it can be grown to advantage only in sections where the minimum temperature is not lower than 10° F. above zero and where ordinary alfalfa can be made to succeed.

INSTRUCTIONS ADAPTED TO THE SOUTHWESTERN UNITED STATES.

Preparation for seeding.—Peruvian alfalfa requires practically the same soil and cultural conditions as ordinary alfalfa—i. e., it requires a fertile soil and a well-prepared seed bed. The ground should be plowed deep, thoroughly harrowed, and rolled before seeding. With a firm seed bed the chances of securing a good stand are greater and less seed is required per acre.

Seeding.—Peruvian alfalfa, like ordinary alfalfa, should be sown without a nurse crop. The use of the press drill is advised in preference to the broadcast method of seeding, since by the use of the drill less seed is required and a uniform stand is more certain to be secured. However, if the drill is not available, the seed can be broadcasted, but in this case more seed is required than in drilling. If a press drill is used, 15 pounds of seed is sufficient for a good stand, but 20 pounds is required if the seed is broadcasted. The seed should be covered evenly and no deeper than is necessary to give sufficient moisture to insure germination. In light soils it should be covered not deeper than 2 inches and in heavier soils not more than half that depth.

Maintaining a stand.—In order to secure the best quality of hay and maximum yields it is essential to keep a thick stand. This can be accomplished by reseeding thin or bare spots and by cultivating with a spring-tooth or spike-tooth harrow or some similar implement that will give good cultivation. By loosening the soil and keeping down weeds the crowns of the plants are induced to spread and fill up open spaces and give a heavier production of crown shoots.

INSTRUCTIONS ADAPTED TO THE SOUTH ATLANTIC AND GULF STATES.

Soil requirements.—A deep, fertile, well-drained, nonacid soil, reasonably free from weeds, is required. It is practically useless to sow alfalfa on thin soils where the bedrock approaches the surface, on land underlain by hardpan, or in locations where the subsoil is so compact that the roots can not penetrate it to considerable depths. It is also equally useless to attempt to grow alfalfa on land where the water table comes near the surface. For the purpose of ascertaining

the character of the soil and subsoil and also the depth to the water table. frequent borings should be made with a soil auger. In determining the adaptability of a tract of land to alfalfa, this instrument will be of greater assistance than a chemical analysis of the soil. Not only should the land have good underdrainage, but the surface should have sufficient slope to carry off the surplus water readily. Rich river or creek bottom lands subject to overflow are adapted to alfalfa, provided such lands are well drained and the overflows are not of long duration. Limestone soils are also generally well suited to this crop, but even they are frequently found to be acid and will grow alfalfa successfully only after an application of lime.

Preceding crop.—When once started under favorable soil conditions, weeds will likely prove the most dangerous enemy. For this reason it is best to precede alfalfa for one or two years with crops which are either clean cultivated or which themselves choke out the weeds, as, for instance, cowpeas. Early truck and potato crops furnish excellent opportunities for destroying weeds and may generally be taken off the land in time to give ample opportunity to prepare it for fall seeding. The crop can also follow oats and wheat to good advantage, provided the land has previously been treated in such a manner as to destroy most of the weeds. Excellent results are also secured on summer fallow, but this system is often objected to on the ground that it results in the loss of the use of the land for a large part of the season.

Preparation of land.—A fair supply of humus is often as important for alfalfa as a liberal supply of the different fertilizing constituents. For this reason, in the absence of an abundance of good stable manure, it is desirable to plow under some green-manure crop, such as red clover, crimson clover, bur clover, cowpeas, or soy beans, or rye and vetch, the kind of crop depending on the locality. Cowpeas can not well be plowed under in time for planting alfalfa the same season, as the vines do not have sufficient time to decay before time for planting. They can be plowed under the autumn previous and the land sown to crimson clover or rye that fall or to cowpeas the following spring. If sown again to cowpeas, they should be sown early, mowed, and the stubble disked and repeatedly harrowed to bring the land into the necessary well-settled and finely pulverized condition. Red or crimson clover or rye and vetch can be turned under and the ground harrowed frequently until late summer or early fall, when the seeding should take place. Where alfalfa is to follow wheat or oats, the land should be plowed or double disked just as soon as these crops are removed and harrowed at least once a week until time for seeding. If it is to follow potatoes or some other truck crop and the field is clean, rich, and mellow, the potato vines or other refuse should be raked off, the land disked, and then put

into fine tilth with a spike-tooth harrow. In sections where considerable silage corn is produced, successful stands of alfalfa are sometimes obtained from seeding after the corn is removed, the land being treated in practically the same manner as where the crop follows early potatoes.

Liming.—Practically all the soils in the region under consideration are benefited by applications of lime. It may be applied with a manure spreader, fertilizer distributor, lime distributor, or by hand. Any method which spreads the lime uniformly and at low cost is satisfactory. It should be spread at least two or three weeks before seeding, in order that it may become thoroughly incorporated with the soil. At least a ton of burned lime is generally required to the acre, and larger applications are often necessary. If ground limestone or ground oyster shells are used, the quantity should be double that of the burned lime. Experiments have shown very little difference in the results obtained from the different forms of lime. Burned lime will give quicker results, but the ground limestone and ground oyster shell will finally give the same benefit provided the same amount of calcium oxid is applied. Where the consumer pays the freight, it should be remembered that he will not only have to pay such charges on practically twice as much of the ground limestone as of the burned lime, but will also be to the additional expense of hauling and spreading two tons of the former to one of the latter in order to obtain the same results.

Fertilizing.—Well-rotted barnyard manure which is comparatively free from weeds is the most satisfactory fertilizer. It should be spread on the land before plowing, in order that it may become thoroughly incorporated with the soil. Good results also follow from heavy applications to the preceding crop. If the manure is not available, a liberal application of commercial fertilizers rich in phosphoric acid should be made. The percentage of nitrogen may be low, but some nitrogen should be supplied for the young plants before they become inoculated and are able to secure their supply from the air. On a large majority of clay soils heavy applications of potash have not been profitable. A combination which has been commonly recommended is muriate of potash 75 to 100 pounds, acid phosphate 350 to 500 pounds, and nitrate of soda 50 to 75 pounds to the acre.

Inoculation.—Nitrogen-fixing bacteria should be provided unless the soil is known to be naturally supplied with these germs. This may be accomplished best by scattering over the area to be seeded soil from an old alfalfa field or sweet-clover patch. The soil should be broadcasted at the rate of from 250 to 500 pounds per acre and harrowed in immediately. The spreading should take place on a cloudy day or in the evening, as the sun's rays are destructive to the

germs. Care should be taken to avoid introducing noxious weeds and fungous diseases. Another method which may be used is that of inoculating the seed with an artificial culture, a limited quantity of which can be procured from the United States Department of Agriculture free of charge. Full instructions for use accompany each bottle of culture. The combined use of soil and artificial cultures is recommended where both can be readily obtained.

Seeding.—The seed should be sown without a nurse crop at the rate of from 25 to 30 pounds per acre. It may be drilled or sown broadcast and covered lightly with a smoothing harrow or weeder. A much more even stand can be secured by dividing the seed and sowing one-half each way of the field. Spring seeding is sometimes successful, but the weeds of midsummer are very likely to destroy the stand. Much better results can be procured by seeding in late summer or early autumn, as soon as the danger from weeds that season is past. This gives time for the plants to make sufficient growth before cold weather to enable them to pass through the winter safely.

Treatment of stand.—The alfalfa should be cut when the plants are just coming into blossom, or, better, when the basal shoots appear, unless the weeds threaten to choke it out before this stage is reached, in which case earlier cutting is recommended. The early cuttings should not be mowed low, as the alfalfa plants will not start so quickly and are more likely to be choked out by weeds. If the first cutting should be light, as is usually the case if the seed is sown in the spring, it may be left on the land as a mulch. If it is heavy enough to smother the alfalfa plants it should be removed. When the plants turn yellow the crop should be cut immediately and removed from the field. If the stand becomes thin or patchy, the field should be plowed and reseeded. Attempts at patching up poor stands have generally proved futile. In cases where the soil has become very compact from pasturing or where weeds are so numerous as to threaten considerable injury to the crop, cultivation in the spring or immediately after cutting, using a weeder on the sandy soils and a spike-tooth harrow on the heavier soils, may be advisable. Another implement which has given good satisfaction is the "alfalfa harrow," which resembles an ordinary spring-tooth harrow with the ends of the teeth narrow and somewhat pointed. No implement which will mutilate the crowns and give an opportunity for the entrance of diseases should be used to cultivate an alfalfa field. A top dressing of well-rotted, weed-free stable manure will benefit the crop. This should be applied in the fall or winter and should be evenly distributed to avoid smothering the plants. If the stable manure is not available, a top dressing of from 300 to 500 pounds of acid phosphate per acre, with a small amount of potash, will nearly always prove beneficial.

Alfalfa makes good pasture for nearly all kinds of farm animals, but under no circumstances should it be pastured until it has become thoroughly established, nor when the ground is wet or frozen. It should not be pastured closely at any time, for the grazing down of the crowns will often result in destruction. Owing to the difficulty of procuring a good stand in the East, it is very doubtful whether a farmer should take the chance of injuring a well-established stand by pasturing it at all.

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